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IN THE

Supreme Court of the United States

OCTOBER TERM 1977

No. 77-642

LUTRELLE F. PARKER, ACTING COMMISSIONER OF PATENTS & TRADEMARKS,
Petitioner,

v.

DALE R. FLOOK,
Respondent.

On Writ of Certiorari to the United States Court of Customs and Patent Appeals

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BRIEF AMICUS CURIAE FOR THE COMPUTER & BUSINESS EQUIPMENT MANUFACTURERS ASSOCIATION (CBEMA)

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Digitronics Corp. v. *New York Racing Association, Inc.*, 187 U.S.P.Q. 602, 631 (E.D.N.Y. 1975) aff'd. 553 F.2d 740 (2d Cir. 1977)	16
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International Telephone & Telegraph Co. v. *Raychem Corp.*, 538 F.2d 453, 457 (1st Cir.) cert. denied, 429 U.S. 886 (1976)	15
Koppers Co. v. *S & S Corrugated Paper Machinery Co.*, 517 F.2d 1182, 1188 (2d Cir. 1975)	15
Mackay Co. v. *Radio Corp.*, 306 U.S. 86, 94 (1939)	12
National Lead Co. v. *Western Lead Products Co.*, 324 F.2d 539 (9th Cir. 1963)	14
Parker v. *Motorola, Inc.*, 524 F.2d 518, 531-32 (5th Cir. 1975) cert. denied, 425 U.S. 975 (1976)	15

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Precision Instrument Mfg. Co. v. *Automatic Maintenance Mach. Co.*, 324 U.S. 806, 816 (1945)	12
Republic Industries, Inc. v. *Schlage Lock Co.*, 433 F.Supp. 666 (S.D. Ill. 1977)	15
In re Richman, 563 F.2d 1026 (C.C.P.A. 1977)	11
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In re Waldbaum, 559 F.2d 611 (C.C.P.A. 1977)	11
OTHERS:	
Article 7 of the French Patent Law of January 2, 1968. (An English translation appears in Industrial Property 67-75, BIRPI, Geneva, Switz., March 1968)	25
Binger, The Computer: Engine of the Eighties, Advanced Management Journal (January 1967)	22
Bjerrum, "Forecast of Computer Development and Applications 1968-2000," Futures, June 1969	22
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Computers in Higher Education, Report of the President's Science Advisory Committee, February 1967	23
Copyright Act, P.L. 94-553, 17 U.S.C. § 101 et. seq. (Oct. 19, 1976)	26
5 Deller's Walker on Patents, § 445, p. 205 (2d ed. 1972)	9
Diebold, "The New World Coming", Saturday Review (July 23, 1966)	22
Ex parte Jepson, 1917 Dec. Com. Pat. 62	9
European Patents Act	25
F. G. Withington, "Beyond 1984: A Technology Forecast," Datamation, Vol. 21, No. 1 Jan. 1975	22

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Hammer, "Electronic Systems for Today and Tomorrow", Paper for State Department Seminar (June 1969)	22
Hansen Computers in Education, The Clearing House (December 1970), Vol. 45, No. 4, p. 195	23
H. R. Report 94-1476, 94th Cong. 2d Sess. 54 (1976)	27
Information Processing in the United States: A Quantitative Summary (American Federation of Information Societies, Inc. 1977)	18
McCarn and Moriarty, "Computers in Medicine", Hospitals J.A.H.A. January 1, 1971; The Computer in Medicines, Am. News. (March 2, 1970) "Computers in Medicine, Datamation (May 1969)	22
Martino "What Computers May Do Tomorrow", The Futurist (October 1969)	22
Occupational Projections & Training Data, Bulletin 2020 (U.S. Dept. of Labor, Bureau of Labor Statistics 1978)	18
P.L. 93-537 (1974)	27
"Report by the National Commission on New Technological Uses of Copyrighted Works" (1977)	26
Rule 75(e), Rules of Practice in Patent Cases, 36 F.R. 12,689 (Sept. 1, 1971)	9
"To Promote the Progress of . . . Useful Arts In An Age of Exploding Technology," Report of the President's Commission on the Patent System (Govt. Printing Off. 1966)	21
"The Uneasy Case for Copyright" A Study of Copyright in Books, Photocopies and Computer Programs," 84 Harv. L. Rev. 281, 340-51 (1970)	6
U.S. Copyright Office Announcement SML-47 (May 19, 1964)	26
U.S. Government Occupational Outlook Handbook, 1976-77 edition	18

TABLE OF AUTHORITIES—Continued

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Ware, "Future Computer Technology and its Impact," The Rand Corporation (March 1966)	22
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BRIEF AMICUS CURIAE FOR THE COMPUTER & BUSINESS EQUIPMENT MANUFACTURERS ASSOCIATION (CBEMA)

I

QUESTION PRESENTED

Whether a process is patentable under 35 U.S.C. § 101 where the sole point of novelty in the process is a mathematical algorithm.

II

INTEREST OF THE COMPUTER & BUSINESS EQUIPMENT MANUFACTURERS ASSOCIATION

This brief Amicus Curiae is submitted by the Computer & Business Equipment Manufacturers Association (CBEMA) in accordance with Rule 42(2) of this Court. CBEMA has received consent from both parties to file this brief. The letters of consent have been filed with the Clerk of the Court.

CBEMA is the trade association which, along with its predecessor, the Business Equipment Manufacturers Association, has represented the computer and business equipment industry for the past 62 years. The forty companies comprising the current CBEMA membership include the nation's leading manufacturers of computers, business equipment and computer-related products.[1] While product lines of member companies vary widely, the following list is illustrative: electronic computers, computer software including programs, computer input and output devices, computer storage devices, support services, data transmission equipment, optical character readers, addressing machines, accounting machines, bookkeeping machines and office copying machines. CBEMA is also the approved sponsor under the American National Standards Institute for the processing of domestic and international standards relating to information processing, computers and office machines.

The members of CBEMA who manufacture computer products have consistently been forerunners in achieving major developments in both the concept and application of computer programming and data processing, and have contributed greatly to the present significant status and

[1] The Honeywell Corporation, a member of CBEMA, does not join in the filing of and does not support this brief.

role of the computer in modern society. These members maintain and support extensive activities devoted to applied research and systems development in all phases of computer use and data and information processing.

Not only is the subject matter of the present case of vital concern to CBEMA members and non-CBEMA members in the computer and data processing field, it is also of vital concern to users of computer equipment, including the Government and the public generally. Resolution of the issues presented by this case will have a significant influence upon both the immediate and the future planning of CBEMA members with respect to ways and means of protecting the proprietary fruits resulting from computer program research and development. Thus, the outcome of the present case will inevitably affect the future growth and development of the data processing industry in the United States and will have a corresponding or greater impact on the vast segments of our society which use and receive the benefits of technological advances in the industry.

III

SUMMARY OF ARGUMENT

The question presented by this case is whether a process involving a number of steps, all of which are old except for a novel mathematical algorithm, is patentable subject matter under 35 U.S.C. § 101. The Court of Customs and Patent Appeals answered this question in the affirmative, on the grounds that the last step of respondent's claimed process comprises using the solution of his novel mathematical algorithm to control a conventional chemical process. Accordingly, the Court concluded that respondent was not seeking patent protection for the algorithm itself, a result clearly prohibited by this Court's decision in *Gottschalk* v. *Benson*, 409 U.S. 63 (1972).

Since it is a simple matter for any competent patent draftsman to write claims appending post-solution activity to a novel mathematical algorithm, the decision below effectively sanctions the patenting of such algorithms. To countenance this result would be to recognize form over substance and permit the patenting indirectly of that which may not be patented directly.

Respondent's attempt to patent a process in which the sole element of novelty lies in the mathematical formula used therein flies in the face of the long-standing rule that the discoverer of a scientific or mathematical principle has no claim to a monopoly of it. Only a novel and useful application of the principle is patentable subject matter, and one cannot render a non-novel application of such a principle patentable by "borrowing" novelty from the principle. Since respondent's process does not involve a novel application of the principle—or indeed any novelty at all other than the principle itself—his claim must fail.

This is not to say, however, that all process inventions (or, alternatively, apparatus inventions) embodying a novel mathematical algorithm should be unpatentable. Where the claimed invention produces synergism, *i.e.*, where through co-action among the steps of the process, or the elements of an apparatus, the effect of the combination, considered as a whole, is unobvious in view of the individual steps or elements considered separately, the claimed invention should be recognized as being statutory under 35 U.S.C. § 101. Conversely, a combination should not be patentable under 35 U.S.C. § 101 where the sole point of novelty in the combination is a mathematical algorithm and there is no synergism among the elements of the combination. Since there is no synergism in the present case—respondent's process being simply an aggregation of separate steps, each of which produces the same effect as it did in prior art embodiments—the Lower Court's holding should be reversed.

Reversal of the decision below would also obviate the implied holding of the Lower Court that computer programs may be patented—a decision of far-reaching social and economic consequence—which results from the fact that mathematical algorithms, including respondent's algorithm in this case, may readily be programmed. There are a number of policy considerations that militate against the patenting of computer programs. First, the computer and computer programming industries have developed and grown rapidly in an atmosphere of free interchange of computer programs, notwithstanding the absence of patent protection. Second, if patents on computer programs are permitted, users, such as the Government, will be burdened with the difficult, time-consuming and expensive task of determining the existence of potential infringement claims arising out of programs they intend to use. Third, since many countries do not permit the patenting of computer programs, serious international legal and balance of trade problems may result if computer programs become patentable in this country. Reversal of the decision below would not totally preclude protection for computer programs, however, since the new Copyright Act, P.L. 94-553, specifically provides that programs may be copyrighted.

IV

ARGUMENT

A. The Decision Below

Respondent's invention relates to a method for calculating updated "alarm limits" [2] for process variables, such as temperature or pressure, involved in the catalytic conversion of hydrocarbons. The method comprises the steps

[2] An "alarm limit" is the permissible maximum (or minimum) value of a particular process variable. If the value of the process variable goes beyond the alarm limit, corrective action must be taken by the system operator.

of (1) determining the present value of the process variable, (2) updating the alarm limit value by carrying out a mathematical algorithm [3] on the data obtained from the first step,[4] and (3) readjusting the alarm limit to this updated value. In the preferred embodiment of respondent's process a general purpose digital computer is programmed [5] to calculate the updated alarm limit values pursuant to respondent's algorithm.

The record before the Court of Customs and Patent Appeals revealed that the steps in respondent's process are conventional,[6] and that the only novelty therein lies in

[3] An "algorithm" is a step-by-step procedure for accomplishing a desired result or solving a particular problem. *See Gottschalk* v. *Benson*, 409 U.S. 63, 65 (1972).

[4] The mathematical algorithm in the second step, as claimed by respondent, comprises two separate equations—the first for calculating a new "alarm base," *i.e.*, a new base value for the alarm limit, and the second for updating the alarm limit using this new alarm base. The "alarm base," B_1, is determined from the equation: $B_1 = B_0 (1.0 - F) + PVL(F)$, where B_0 is the current alarm base, F is a predetermined number greater than zero and less than 1.0, and PVL is the present value of the process variable. The updated alarm limit value (herein referred to as UAV) is determined from the equation: $UAV = B_1 + K$, where K is a predetermined alarm offset.

[5] A computer program is a set of instructions to a computer as to how it should manipulate data. The computer program may direct something as simple as adding two plus two, or as complex as determining the proper course for a manned flight to the moon. In solving such problems, the computer can only function in accordance with the algorithm used by the programmer for solving the problem. Given a particular algorithm, the programmer takes the limited number of fixed operations which a computer is capable of carrying out and arranges these operations in a sequence so that the desired algorithm is implemented. Once the algorithm has been established, any programmer can program a general purpose computer to perform the steps of the algorithm. See discussion of the basic elements of computer programming in "The Uneasy Case for Copyright: A Study of Copyright in Books, Photocopies, and Computer Programs," 84 Harv. L. Rev. 281, 340-51 (1970).

[6] Record on Appeal to the Court of Customs and Patent Appeals (hereinafter "R"), at 28, 38.

the mathematical algorithm employed in the second step. Thus, in previous control systems, the alarm limits were adjusted manually based upon the present values of the process variables (R 28, 38), or were automatically adjusted after computing updated alarm limit values (R 14, 64). As admitted by respondent, programming of his mathematical algorithm is "well within the ordinary skill of the art" (R 60-61), and the Patent Examiner found "no unexpected results" from automating respondent's process. (R 70).

The Board of Appeals of the Patent and Trademark Office ruled that since respondent's only contribution was "the formulas or algorithm claimed" (R 77) his claims were unpatentable under this Court's decision in *Gottschalk* v. *Benson*, 409 U.S. 63 (1972). The Court of Customs and Patent Appeals reversed, however, holding that respondent had claimed a patentable process under 35 U.S.C. § 101.

B. Respondent's Claimed Process Is Not Patentable Under 35 U.S.C. § 101.

1. *The Decision Below Conflicts with this Court's Holding in* Gottschalk v. Benson.

In *Gottschalk* v. *Benson*, this Court held that a mathematical algorithm for converting binary-coded-decimal numerals into binary numerals, which had been embodied in a computer program, was not a patentable process within the meaning of 35 U.S.C. § 100(b).[7] In reaching this holding the Court looked beyond the form of the claimed invention to its substance—a mathematical algorithm having "no substantial practical application except in connection with a digital computer"—and concluded

[7] 35 U.S.C. § 100(b) provides: "The term 'process' means process, art or method, and includes a new use of a known process, machine, manufacture, composition of matter or material."

that the "practical effect" of affirming the Court of Customs and Patent Appeals would be to grant a patent "on the algorithm itself." 409 U.S. at 71-72.

In its decision below, the Court of Customs and Patent Appeals held respondent's process patentable under 35 U.S.C. § 101,[8] based solely on the fact that respondent's claims recite a step subsequent to performance of the mathematical algorithm, namely, adjusting the chemical control system's existing alarm limit to an updated alarm limit calculated by the mathematical algorithm. Based on this post-solution activity the Lower Court reasoned that respondent's claims "do not preempt the formula or algorithm contained therein, because solution of the algorithm, per se, would not infringe the claims." *In re Flook*, 559 F.2d 21 (C.C.P.A. 1977) at 23.

By this decision the Lower Court has permitted the *form* of respondent's claims to triumph over the *substance* of respondent's discovery—a mathematical algorithm—and in the process contravened this Court's explicit holding in *Gottschalk* v. *Benson*. It has taken the untenable position that a process, whose only novelty lies in a mathematical algorithm, is patentable under 35 U.S.C. § 101 if the applicant merely claims that the results of the algorithm subsequently are *used* in conjunction with a physical process.[9]

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[8] 35 U.S.C. § 101 provides: "Whoever invents or discovers any new and useful process, machine, manufacturer or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title."

[9] The fact that all of the steps in respondent's invention are old, with the exception of his novel mathematical algorithm, is vividly demonstrated by recasting Claim 1 (the only independent claim) in so-called "Jepson" form, which is the form preferred by the Patent Office for claiming inventions that are improvements upon known structures or methods:

> 1. In a method for updating the value of at least one alarm limit on at least one process variable involved in the catalytic chemical conversion of hydrocarbons, said method comprising the old steps of (1) determining the present value of said process variable, (2) updating the alarm limit value, and (3) adjusting said alarm limit to said updated alarm limit value; the improvement comprising performing step (2) by solving the following equations:
>
> (a) $B_1 = B_0 (1.0 - F) - PVL(F)$
>
> (b) $UAV = B_1 + K$
>
> where B_0 is the current alarm base, B_1 is the new alarm base, F is a predetermined number greater than zero and less than 1.0, PVL is said present value of said process variable, K is a predetermined alarm offset, and UAV is said updated alarm limit value.

See Ex parte Jepson, 1917 Dec. Com. Pat. 62; Rule 75(e), Rules of Practice in Patent Cases, 36 F.R. 12,689 (Sept. 1, 1971); 5 *Deller's Walker on Patents* § 445, p. 205 (2d ed. 1972).

If the Lower Court's rationale is followed, patents can be obtained on *any* mathematical algorithm simply by appending to the claim any conventional use to which solution of the algorithm could be applied. For example, according to the Lower Court's holding Albert Einstein could have obtained a patent on his equation $E = Mc^2$, which demonstrates the fundamental relationship between energy and matter, simply by claiming its use in connection with the generation of electricity in a nuclear power plant, even though all elements in the claimed invention were old except for this equation. Or, Sir Isaac Newton could have claimed the formula $F = ma$, which expresses the force created by an accelerating body, merely by appending to his claim its use in the operation of an automobile, forging machine, or any other well-known mechanical device employing this elementary principle. Any competent patent draftsman can write claims applying the solution of an algorithm to well-known processes within the technological arts. This Court should not permit its holding in *Benson* to be circumvented by routine claim drafting techniques which hide the true nature of the claimed invention and permit the patenting indirectly of subject matter which may not be patented directly.

The Lower Court's acceptance of form over substance is further illustrated by comparison of the decision below with its earlier decision *In re Christensen*, 478 F.2d 1392 (C.C.P.A. 1973). There, the applicant sought to patent a method of determining the porosity of subsurface formations by first performing a number of well-known mechanical and measuring steps, which yielded the values of various physical parameters, followed by computing the porosity according to applicant's novel mathematical algorithm applied to these parameter values. Since all of the steps, with the exception of the mathematical algorithm, were shown by the prior art, the "narrow" question considered by the Lower Court was whether "a method claim in which the point of novelty is a mathematical equation to be solved as the final step of the method, [is] a statutory method." 478 F.2d at 1394. The Lower Court answered this question in the negative, based upon the following rationale:

> Given that the method of solving a mathematical equation may not be the subject of patent protection, it follows that the addition of the old and necessary antecedent steps of establishing values for the variables in the equation cannot convert the unpatentable method to patentable subject matter. *Id.*

In the present case, however, the Lower Court distinguished *Christensen* on the grounds that respondent's claims included "recitation of post-solution activity, a step in which the solution [of the algorithm] is applied to a control system," notwithstanding the fact that this post-solution step was conventional. 559 F.2d at 23. Thus, according to the Lower Court the only distinction between patentable and non-patentable processes, where the sole point of novelty lies in a mathematical algorithm, is that claims to the former recite post-solution activity while

claims to the latter do not.[10] Since claiming such activity is merely a matter of form, well within the skill of competent patent draftsmen, the Lower Court effectively sanctions the patenting of *any* algorithm.

2. *The Decision Below Is Contrary to the Long-Standing Rule That Ideas and Principles Are Unpatentable and That Only New and Useful Applications of Them May Be Patented.*

Respondent seeks a patent for a process in which the sole point of novelty is a mathematical algorithm, subject matter which even respondent concedes is unpatentable by itself. The law could not be more clearly opposed to this attempt.

The relevant provision in the Constitution governing the granting of patents is contained in Article I, Section 8, Clause 8, which provides:

> The Congress shall have Power . . . to promote the Progress of . . . useful Arts, by securing for limited Times to . . . Inventors the exclusive Right to their . . . Discoveries.

The focus of the patent clause (and the statutes implementing that clause) is on "progress" and Congress is granted only a "qualified authority . . . limited to the promotion of advances in the 'useful arts'." *Graham* v. *John Deere Co.*, 383 U.S. 1, 5 (1966). Consistent with this goal of scientific advancement, this Court has held unpatentable ideas, principles, phenomena of nature, mental processes and other abstract intellectual concepts. This classic wisdom was recently reiterated by the Court in *Gottschalk* v. *Benson*:

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[10] *Compare, In re Chatfield*, 545 F.2d 152 (C.C.P.A. 1976), *cert. denied*, 46 U.S.L.W. 3219 (U.S. Oct. 4, 1977); *In re Deutsch*, 553 F.2d 689 (C.C.P.A. 1977), with *In re Waldbaum*, 559 F.2d 611 (C.C.P.A. 1977); *In re Richman*, 563 F.2d 1026 (C.C.P.A. 1977); *In re de Castelet*, 562 F.2d 1236 (C.C.P.A. 1977).

> "An idea of itself is not patentable." *Rubber-Tip Pencil Co.* v. *Howard*, 20 Wall. 498, 507. "A principle, in the abstract, is a fundamental truth; an original cause; a motive; these cannot be patented, as no one can claim in either of them an exclusive right." *LeRoy* v. *Tatham*, 14 How. 156, 175. Phenomena of nature, though just discovered, mental processes, and abstract intellectual concepts are not patentable, as they are the basic tools of scientific and technological work.

409 U.S. at 67. *See also Burr* v. *Duryee*, 68 U.S. 531, 570 (1864); *Fuller* v. *Yentzer*, 94 U.S. 288, 289 (1877); *Tilghman* v. *Proctor*, 102 U.S. 707, 724-26 (1880).

From this longstanding rule derives the equally venerable corollary that only a new and useful application of a principle is patentable. "While a scientific truth, or the mathematical expression of it, is not a patentable invention, a *novel and useful* structure created with the aid of knowledge and scientific truth may be." *Mackay Co.* v. *Radio Corp.*, 306 U.S. 86, 94 (1939) (emphasis added).[11]

The requirement that application of a scientific or mathematical discovery be new and useful received its most extensive treatment in *Funk Brothers Seed Co.* v. *Kalo*

[11] The purpose of the novelty requirement is clear. As the Court observed in *Graham*, "The patent monopoly was not designed to secure to the inventor his natural right in his discoveries. Rather, it was a reward, an inducement, to bring forth new knowledge. The grant of an exclusive right to an invention was the creation of society—at odds with the inherent free nature of disclosed ideas—and was not to be freely given. Only inventions and discoveries which furthered human knowledge, and were *new and useful*, justified the special inducement of a limited private monopoly." (383 U.S. at 9; emphasis added.) "Innovation, advancement, and things which add to the sum of useful knowledge are inherent requisites in a patent system which by constitutional command must 'promote the Progress of . . . useful Arts.'" 383 U.S. at 6. *See also Precision Instrument Mfg. Co.* v. *Automotive Maintenance Mach. Co.*, 324 U.S. 806, 816 (1945).

Inoculant Co., 333 U.S. 127 (1948), in which the Court started with the premise that "[h]e who discovers a hitherto unknown phenomenon of nature has no claim to a monopoly of it which the law recognizes. If there is to be invention from such a discovery, it must come from the application of the law of nature to a new and useful end." 333 U.S. at 130. The Court then made clear that invention could not be "borrowed" from the principle or idea itself.

In *Funk*, the patent holder had used known techniques to experiment with various strains of bacteria that were used in connection with fertilizing crops. He discovered that several strains of these bacteria might be found compatible and therefore could be used together. This would eliminate the need for several independent applications to crops of individual strains of the bacteria. The patent holder's experimentation was successful, and he was able to package combinations of these bacteria. It was conceded that the product was new, useful, and more efficient than its predecessors. Nevertheless, the Court held that his discovery was the principle of nature that certain strains of these bacteria were compatible. The method of packaging the bacteria was a simple step once it was known that certain strains were indeed compatible:

> [O]nce nature's secret of the noninhibiting quality of certain strains of the species of Rhizobiu was discovered, the state of the art made the production of a mixed inoculant a simple step. Even though it may have been the product of skill, it certainly was not the product of invention. *There is no way in which we could call it such unless we borrowed invention from the discovery of the natural principle itself.* That is to say, there is no invention here unless the discovery that certain strains of the several species of these bacteria are non-inhibiting and may thus be safely mixed is invention. But we cannot so hold without allowing a patent to issue on

> one of the ancient secrets of nature now disclosed. All that remains, therefore, are advantages of the mixed inoculants themselves. They are not enough. (333 U.S. at 132; emphasis added.)

See also Armour Pharmaceutical Co. v. *Richardson-Merrell, Inc.*, 396 F.2d 70 (3d Cir. 1968); *National Lead Co.* v. *Western Lead Products Co.*, 324 F.2d 539 (9th Cir. 1963); *Davison Chemical Corp.* v. *Joliet Chemicals, Inc.*, 179 F.2d 973 (7th Cir.), *cert. denied*, 340 U.S. 816 (1950).

The *Funk* principle was most recently reaffirmed in *Benson*. Moreover, the *Benson* court explicitly held that the rule was not limited to "product" claims but applied as well to "process" claims such as that at issue herein. 409 U.S. at 67-68. The *Funk* principle therefore mandates reversal in the present case, inasmuch as the only novel subject matter in respondent's process is the mathematical formula.

Respondent discovered a mathematical relationship between certain process variables in the catalytic conversion of hydrocarbons and certain alarm limits as these vary during the conversion process. Since the formula is concededly unpatentable, he seeks only to patent its application. However, the application is clearly not new, and he makes no claim to the contrary. Not only is the use of alarm limits in the process of catalytic conversion of hydrocarbons well established, but the practice of dynamically updating them as the conversion progresses is also standard procedure. (R 7-9.) Nor has respondent devised any new equipment to carry out the application. (R 14, 32-35, 44-49.) Once the mathematical relationship was discovered, the application—be it manual or automatic updating of the limits—was, like the packaging in *Funk*, an obvious and simple step. And, as in *Funk*, there is no way to call this step the product of invention unless we do the impermissible—borrow patentable in-

vention from the discovery of the mathematical formula itself.

3. *There Is No Synergism Resulting from Use of Respondent's Novel Algorithm in a Conventional Process.*

CBEMA does not contend in this case, nor do this Court's prior decisions require, that every process comprising conventional steps and including a novel algorithm is unpatentable. This Court, as well as many lower federal courts, have held that a combination of old elements may be patented only if there is synergism, *i.e.*, the individual steps in the process must co-act in an unobvious way, such that the effect created by the combination, considered as a whole, is unobvious in view of the individual steps considered separately.[12]

While the synergism concept, as such, has been applied in the past only to cases drawing into question obviousness under 35 U.S.C. § 103,[13] there is no logical reason

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[12] *See, e.g., Sakraida* v. *Ag Pro, Inc.*, 425 U.S. 273 (1976); *Anderson's Black Rock, Inc.* v. *Pavement Salvage Co.*, 396 U.S. 57 (1969); *Digitronics Corp.* v. *New York Racing Ass'n, Inc.*, 553 F.2d 704, 747 (2d Cir. 1977); *Parker* v. *Motorola, Inc.*, 524 F.2d 518, 531-532 (5th Cir. 1975), *cert. denied*, 425 U.S. 975 (1976); *Ingersoll-Rand Co.* v. *Brunner & Lay, Inc.*, 474 F.2d 491, 496 (5th Cir.), *cert. denied*, 414 U.S. 865 (1973); *Koppers Co.* v. *S&S Corrugated Paper Machinery* Co., 517 F.2d 1182, 1188 (2d Cir. 1975); *Phillips Industries, Inc.* v. *State Stove & Mfg. Co.*, 522 F.2d 1137, 1141 (6th Cir. 1975); *International Telephone & Telegraph Corp.* v. *Raychem Corp.*, 538 F.2d 453, 457 (1st Cir.), *cert. denied*, 429 U.S. 886 (1976); *Republic Industries, Inc.* v. *Schlage Lock Co.*, 433 F.Supp. 666 (S.D. Ill. 1977).

[13] 35 U.S.C. § 103 provides:

> A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

why it should not also be used in determining the status under 35 U.S.C. § 101 of a process in which the only novel step is a mathematical algorithm. Thus, where every step in the process is old, with the exception of a novel algorithm, patentability of the combination should turn on whether the interaction among the old elements and the new algorithm produces a synergistic effect.

This approach would preclude obtaining patents by facile claim drafting techniques—the evil inherent in the Lower Court's decision—since mere recitation of post-solution steps would not form the basis for patentability. Instead, the claimed combination would be patentable only if there were synergism resulting from use of the new algorithm with the old steps.

In the present case, it is clear that respondent's invention fails to produce any synergistic effect. The old steps in the "exhausted" combination [14] of determining the present value of a process variable (which precedes performance of the algorithm) and readjusting the alarm limit (which follows performance of the algorithm) are unaffected by respondent's novel algorithm. These steps are performed the same way and produce the same results as they did in the prior art; respondent's algorithm has merely replaced the prior art method of generating updated alarm limit values with a method that can be implemented by a computer conventionally programmed in accordance with the steps of the algorithm. Under the foregoing principle, his claimed process clearly is non-statutory, whether the alarm limit values are adjusted manually or automatically.[15]

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[14] *See Digitronics Corp.* v. *New York Racing Ass'n, Inc.*, 187 U.S.P.Q. 602, 631 (E.D.N.Y. 1975), *aff'd*, 553 F.2d 740 (2d Cir. 1977).

[15] R 77.

C. Policy Considerations Against the Availability of Patents for Algorithms and Computer Programs.

While the decision below nominally deals only with the patentability of mathematical algorithms used in conjunction with technological processes, its practical implications are substantially more far-reaching. As explained by respondent in his patent application, the preferred implementation of his algorithm is by computer, *i.e.*. respondent's algorithm is to be programmed on a digital computer, which calculates the updated alarm limits. Since any algorithm can be claimed in the form sanctioned by the Lower Court and since computer programs routinely can be derived from mathematical algorithms (and vice versa), the decision below effectively permits patenting of computer programs. It is this ultimate issue, left unanswered in *Gottschalk* v. *Benson*, that also deserves careful consideration by this Court and to which the remainder of this brief is addressed.

1. *The Computer Industry Has Developed in an Atmosphere of Free Interchange of Computer Programs.*

In three decades the computer industry has become a major and substantial factor in our economy and now impacts virtually all segments of society. When computers were first used commercially less than thirty years ago, a number of respected businessmen, scientists and public officials believed that the ultimate need for such highly sophisticated devices would be limited to a few dozen systems. In fact, the uses and applications of computers have increased beyond the most extravagant earlier projections, and by 1977, over 500,000 computer systems made by American-based companies were reported to be in use, with a cumulative value of $85.7 billion.[16] This

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[16] EDP Industry Report, April 22, 1977, at 4. These figures are for worldwide use of computers made by American companies. In

rapid growth will continue over the next few years, and it has been estimated reliably that by 1981 there will be over 1,100,000 American-made computer systems in use, with a value in excess of $138 billion.[17]

In the so-called programming and software side of the industry, computer users are already spending as much on software as they are on computer hardware, and the software field has itself become a multi-billion dollar sub-industry.[18] Thus, it has been estimated reliably that the gross revenues of United States computer firms from the sale of software throughout the world was $790 million in 1971, $1.6 billion in 1976, and, by 1981, will be $5.6 billion.[19]

The tremendous growth of the computer software industry and the vast number of breakthroughs in the field of programming, which have occurred in the last three decades, have by and large taken place in a legal framework conducive to the free interchange of ideas and information among computer users. Industry experience shows

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the United States alone, the cumulative value of computer systems in use in 1976 is estimated at $43.1 billion and by 1980 this figure is projected at $70.7 billion.

[17] *Id.*

[18] To select an arbitrary point in time to illustrate the growth factor, in 1957 the Association for Computing Machinery had approximately 3,000 members, which represented the vast majority of the working computer programmers in the United States. Some 17 years later, in 1974, it was estimated that there were 195,000 employed programmers and, by 1985, it has been estimated that there will be 290,000 working programmers. *See* "Information Processing In the United States: A Quantitative Summary" (American Federation of Information Societies, Inc., 1977); U.S. Gov. Occupational Outlook Handbook, 1976-77 edition; "Occupational Projections & Training Data," Bulletin 2020 (U.S. Dept. of Labor, Bureau of Labor Statistics 1978).

[19] "Information Processing In the United States: A Quantitative Summary" (American Federation of Information Processing Societies, Inc., 1977), at 11.

that new algorithms and programming procedures, as well as specific programs, have been widely disseminated and generally exchanged. This atmosphere of intellectual freedom has contributed significantly to the enormous strides made in the use of computers.

Wide dissemination of computer programs has benefited the users of computers and the public at large. For years professional journals have published algorithms and pertinent discoveries in mathematics in order to encourage overall advancement of the "state of the art" of programming. At various seminars and symposia on computer programming, open, frank and public discussions have been held concerning newly formulated algorithms or refinements of existing algorithms, and the participants have sought to build upon and improve the overall level of knowledge in the programming field. However, if patent protection for algorithms and their associated computer programs is permitted merely by the semantic innovations allowed by the Lower Court in this case, more restrictive and inhibiting information handling practices will be inevitable. In fact, certain professional journals have already taken the position that they will no longer publish allegedly novel algorithms if the person who develops them claims patent protection.[20]

Another significant consideration is that the programming industry is quite different from other industries in which patent laws have wide application. One of its unique characteristics is that almost all of the end users of programs are also creators and duplicators of pro-

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[20] The Association of Computer Machinery ("ACM") has taken this position with respect to its monthly publication known as the *Communications of the ACM*. The membership of this association includes many professional computer programmers who rely upon and look to such professional journals for maintaining and improving their general knowledge concerning developments in the programming field.

grams.[21] Although there are thousands of computer systems in this country, these systems service millions of users. Many of these user organizations have large staffs of programmers who spend full time preparing new algorithms or sets of instructions for programs, and these same users characteristically spend more for computer programming services than they pay for use of the computer.

In permitting the originator of an algorithm to obtain patent protection simply by claiming post-solution activity, the Lower Court has imposed substantial practical impediments upon all users of computers. Users will be forced to assume a major responsibility for determining potential infringement claims arising out of computer programs they intend to use. They will be burdened with the need to spend substantial time and money in right-to-use searches each time a different algorithm is to be programmed on an existing computer. Some may even employ secret methods of handling computer programming information in order to prevent others from ascertaining that they may have infringed an existing patent. Adversely held patents based upon computer programs will be a constant threat to the unrestricted use of computers.

A patent may be infringed without knowledge of the patent or intent to infringe. If computer programs were patentable by means of the claiming techniques sanctioned by the court below, each user of a computer would proceed at his peril in employing the computer for his particular application. He would never know whether the algorithms in his program were specifically covered by an existing patent or were the equivalent of a claim in a patented program. Such users could be confronted with the real possibility that use of a particular algorithm

[21] It is the user of a computer who often devises the applications programs, *i.e.*, the programs which adapt the computer and a general systems program to his specific uses.

would involve them in infringement litigation unless they were to pay royalties claimed by holders of patents covering allegedly comparable programs.

It is not a practical answer to say that each user could make a search to determine whether his proposed program infringed an existing patent. There is not now—and there does not appear to be in the future—any feasible way in which such searches could be made.[22] Nor can the burden be assumed by or shifted to, suppliers of computers who do not have responsibility for, or often even knowledge of, the precise programs employed by users of their computers.[23]

2. *Programmed General Purpose Computers Are Important To All Phases of Human Endeavor.*

Increased computer utilization stimulated, in part, by the free and open exchange of computer programs, has contributed to a substantial upgrading of the quality of life for every American. The computer has become the

[22] *See* "To Promote the Progress of . . . Useful Arts In An Age of Exploding Technology," *Report of the President's* Commission on the Patent System (Govt. Printing Off. 1966) at 13, which states:

> The Patent Office now cannot examine applications for programs because of the lack of a classification technique and the requisite search files. Even if these were available, reliable searches would not be feasible or economic because of the tremendous volume of prior art being generated. Without this search, the patenting of programs would be tantamount to mere registration and the presumption of validity would be all but nonexistent.

[23] This Court was confronted with an analogous problem in connection with copyright infringement. In *Twentieth Century Music Corp.* v. *Aiken*, 422 U.S. 151 (1975) the Court held that copyright laws did not prevent the proprietor of a restaurant from freely playing his radio for the enjoyment of patrons. In reaching this conclusion the Court observed that "a person in Aiken's position would have no sure way of protecting himself from liability for copyright infringement except by keeping his radio set turned off." 422 U.S. at 162.

"engine" which assists in running our society [24] and in the future will assist man in numerous areas totally unrelated to the usual applications of today's computers.[25] These applications and computer uses should not be clouded by problems resulting from unwitting infringement by computer users.

Some typical examples of computer uses and applications which have occurred and can occur in the next few years include the following:

Health Care

Computers are monitoring instruments and sensors in intensive care units and give an instantaneous current report of the conditions of each patient in a hospital. Computers also record and analyze laboratory tests and maintain accurate medical records on all patients. They are serving communication and information links among various hospitals and individual doctors' offices and clinics, and are beginning to provide current information on many developments in the medical field. Computers are presently being utilized in assisting medical research in searching for cancer cures.[26]

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[24] Binger, The Computer: Engine of the Eighties, Advanced Management Journal (January 1967).

[25] Among the many articles discussing the revolutionary impact computers will have on our society are the following: F. G. Withington, "Beyond 1984: A Technology Forecast," Datamation, Vol. 21, No. 1 (Jan. 1975); Bjerrum, "Forecast of Computer Development and Applications 1968-2000," Futures (June 1969); Martino, "What Computers May Do Tomorrow," The Futurist (October 1969); Hammer, "Electronic Systems of Today and Tomorrow," Paper for State Department Seminar (June 1969); "What Comes Next in the Computer Age," U.S. News & World Report (June 1967); Diebold, "The New World Coming", Saturday Review (July 23, 1966); Ware "Future Computer Technology and its Impact," The Rand Corporation (March 1966).

[26] McCarn and Moriarty, "Computers in Medicine", Hospitals J.A.H.A. January 1, 1971: "The Computer In Medicine," Am.News, (March 2, 1970); "Computers in Medicine," Datamation (May 1969).

Education

Computer-aided training and instrument techniques have moved from research to implementation making high quality education available to more children on an equal basis. Computers will be heavily responsible for enabling everyone regardless of economic status, to have the advantages of higher learning. In addition, computers are being used increasingly in the world's great research libraries to cope with the exploding growth of recorded knowledge.[27]

Science and Engineering

Computers will continue to contribute to further advances in science and engineering. They have already made possible this country's exploration of other planets and the Apollo Program to put a man on the moon. Scientists perform complex mathematical computations with computers and through them, have available large libraries of data for rigorous analysis. Further, utilization of computers will make possible a pushback in the frontiers of mathematics, chemistry, physics and engineering to an extent difficult to comprehend by present standards. Just one example is the search for new energy sources, which will be aided greatly by computers.

Government

Computers present unique opportunities for Government to be more effective and helpful to the average citizen. With the aid of computer programming techniques, a given problem such as pollution control or urban planning, can be simulated in terms of a mathematical model. This model can then be entered into the computer and the

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[27] *See* Computers in Higher Education, Report of the President's Science Advisory Committee, February 1967; Hansen "Computers in Education," The Clearing House (December 1970), Vol. 45, No. 4, p. 195.

data manipulated to simulate actual results from the application of a proposed solution.

Legal

There are also tremendous potentials for computers to assist in relieving the nation's crowded court dockets, to collect and analyze legal documents and precedents, and to achieve better overall administration of the rapidly increasing workload of the police and law enforcement agencies. Computers are being used increasingly by judges and lawyers to assist in legal research, thereby freeing additional time for analysis. Computers also furnish invaluable assistance in collecting, summarizing and cataloging much of the factual data involved in complex litigation and other areas of the law.

Individual

It is reasonable to expect that computers will continue to present unique opportunities for the average individual in his everyday activities. In the home, computers will assist in performing such functions as food procurement, climate and lighting control as well as other home management functions. Also, computers will make it possible for individuals to obtain information needed on many subjects through point-to-point communication with a central computer or small individually-owned computers. Inexpensive electronic hand-held calculators, some of which are programmable, are already in widespread use. In a few years, computer terminals or communication devices will be just as common in homes as telephones or television sets.

3. *Because Many Countries Do Not Grant Patents on Computer Programs There May be an Adverse Financial Impact Upon the United States Unless the Lower Court's Decision is Reversed.*

At present, many countries in Western Europe prohibit the granting of patents on computer programs. Thus, France enacted a statute which specifically prohibits patent protection for computer programs.[28] Similarly, the new British Patents Act, effective June 1, 1978, specifically excludes computer programs from patent protection, and the new European Patent Convention, which also becomes effective June 1, 1978, specifically excludes patent protection for discoveries, scientific theories and mathematical methods, schemes of rules and computer programs.[29]

Since several countries in Western Europe have decided not to extend patent protection to computer software, a serious international legal and balance of trade problem can result if the Lower Court's decision in this case is affirmed. In such case, someone in a foreign country could easily use or copy a program on which a patent has been issued in this country and have total immunity from any infringement claims under our law. Because of the availability of instantaneous communication between Western Europe and the United States, it would then be possible to use the patented program in Europe and communicate the result directly to a computer located in the United States. Under such circumstances, the domestic patent would be rendered virtually ineffective, and the chief result would be a negative impact on our domestic

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[28] Article 7 of the French Patent Law of January 2, 1968. An English translation appears in Industrial Property 67-75 (BIRPI, Geneva, Switz., March 1968).

[29] Present EPC member countries are Belgium, France, Luxembourg, Netherlands, West Germany, Britain and Switzerland. Signatures expected early this year are Denmark, Italy, Sweden, Austria and Eri[illegible].

economy. Among other things, such results would constitute an unfortunate and avoidable violation of United States employment and trade policy.

D. Computer Programs May Be Copyrighted Under the New Copyright Act.

This Court in *Gottschalk* v. *Benson* observed that if proprietary protection under federal statute is considered necessary for computer programs, it should be accomplished through legislation and not through a distortion of the patent laws.[30]

In this connection the copyrighting of computer programs has become established as an acceptable form of protection. In 1964, the Copyright Office determined that computer programs can be registered under the copyright laws if certain requirements are met.[31] Since that announcement, over 1300 such programs have been registered with the Copyright Office.[32]

Copyright protection for computer programs is now explicitly provided by the new Copyright Act,[33] which became effective January 1, 1978. Under Section 102, 17

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[30] 409 U.S. at 73. "If these programs are to be patentable, considerable problems are raised which only committees of Congress can manage, for broad powers of investigation are needed, including hearings which canvas the wide variety of views which those operating in this field entertain. The technological problems tendered in the many briefs before us indicate to us that considered action by the Congress is needed." [footnote omitted]

[31] *See* U.S. Copyright Office Announcement SML-47 (May 19, 1964). Three conditions which software must meet for copyright protection are: (1) original authorship; (2) publication of copies in a form perceptible or capable of being perceptible to the human eye; (3) depositing copies for registration to consist of or include reproductions in a language intelligible to human beings.

[32] "Report by the National Commission on New Technological Uses of Copyrighted Works" (1977).

[33] P. L. 94-553, 17 U.S.C. § 101 *et seq.* (Oct. 19, 1976).

U.S.C. §102, copyright may be obtained, *inter alia*, for "literary works," which term is defined in Section 101, 17 U.S.C. § 101, as "works, other than audiovisual works, expressed in words, numbers or other verbal or numerical symbols, or indicia, regardless of the nature of the material objects . . . in which they are embodied." According to the legislative history of Section 101, this term "includes computer data bases, and computer programs to the extent that they incorporate authorship in the programmer's expression of original ideas, as distinguished from the ideas themselves." [34]

Of course, as the foregoing legislative history makes clear, the existence of copyright protection does not prevent someone from individually arriving at the same result through his own efforts, and a copyright can only protect the form of expression used in a particular program. Since experience has shown that the copyright law is a viable form of protection in marketing computer programs, Congress has authorized and funded a Presidential Commission [35] to study ways in which protection for computer programs could be strengthened under the copyright law.[36] A final report by the Commission is to be submitted to the President and Congress by July 31, 1978. Accordingly, if increased proprietary protection for computer programs is considered necessary, it will be accomplished through legislation and not through distortion of the patent laws.

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[34] H. R. Report 94-1476, 94th Cong., 2d Sess. 54 (1976).

[35] P.L. 93-537 (1974). Its name is the National Commission on New Technological Uses of Copyright Works (CONTU).

[36] 17 U.S.C. § 117.

V

CONCLUSION

For the foregoing reasons, CBEMA respectfully submits that the mathematical algorithm sought to be patented by respondent in this case is not eligible for patent protection and that the Lower Court's decision should be reversed.

Respectfully submitted,

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